

**THE EFFECTS OF MICRO-LECTURE
APPROACH ON STUDENTS' ENGAGEMENT
AND STUDENTS' ACHIEVEMENT IN FLIPPED
CLASSROOM ENVIRONMENT**

VOON YEUN TING

UNIVERSITI SAINS MALAYSIA

2019

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APPROACH ON STUDENTS' ENGAGEMENT
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CLASSROOM ENVIRONMENT**

by

VOON YEUN TING

**Thesis submitted in fulfillment of the requirement
for the degree of
Doctor of Philosophy**

May 2019

ACKNOWLEDGEMENT

I would like to acknowledge my indebtedness and render my warmest thanks to my main supervisor, Dr. Rozniza Zaharudin, who made this work possible. Her friendly guidance and expert advice have been invaluable throughout all stages of the work. I would express my gratitude to my co-supervisor Assoc. Prof Dr. Azidah Abu Ziden, who has been helpful in giving advice and guidance in all the time of research and writing of this thesis.

Besides my supervisors, I would like to express my special appreciation and thanks for all the professional content experts and language experts by giving me their insightful and valuable suggestions and comments to widen my research from various perspectives. I would want to express my sincere thanks to the School of Educational Studies for all the facilities and assistance to support this research.

This research would not be possible without good financial support. I want to express my deepest gratitude to the Ministry of Higher Education Malaysia by providing financial support for me through MyBrain15 scholarship as it helps me to fulfil my goals to finish my PhD.

This journey has a lot of effort and sacrifice. Nobody has been more important to me in the pursuit of this research than the members of my family. My biggest thanks to my parents Voon Swee Chong and Ng Song Siang, that support, encourage and understand me throughout this journey. Thank you for my beloved siblings Voon Yuen Mi, Voon Ming Chang, Voon Jia Ling as always be with me.

I would also want to express my gratitude to all the people who helped me make this work become possible with their understanding, caring, prayers, encouragement and unlimited supports.

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**KESAN KAEDAH *MICRO-LECTURE* TERHADAP PENGLIBATAN DAN
PENCAPAIAN PELAJAR DALAM PERSEKITARAN PEMBELAJARAN
*FLIPPED CLASSROOM***

ABSTRAK

Institusi pendidikan tinggi di Malaysia masih mempraktikkan kaedah pembelajaran tradisional walaupun terdapat banyak pedagogi pengajaran yang inovatif dan kreatif dalam pendidikan terkini. Kekurangan interaksi antara pensyarah dan pelajar dalam pembelajaran tradisional telah mempengaruhi penglibatan dan pencapaian pelajar dalam persekitaran pembelajaran. Masalah pengajar untuk menggunakan video secara berkesan dalam persekitaran *flipped classroom* juga menyebabkan pelajar tidak dapat memberi tumpuan dan memahami konsep penting mengenai topik yang diajar. Oleh itu, kajian ini mengkaji kesan kaedah *micro-lecture* berasaskan kuiz terhadap penglibatan dan pencapaian pelajar dalam persekitaran pembelajaran *flipped classroom*. Konstruktivisme sosial dan teori beban kognitif pembelajaran pelajar telah menyediakan rangka kerja teori secara komprehensif. Reka bentuk kuasi eksperimen yang menggabungkan hanya ujian pasca saja dan instrumen penglibatan pelajar telah digunakan ke atas sampel 80 pelajar yang mengambil kursus Teknologi Maklumat dan Komunikasi (ICT) di sebuah Universiti Malaysia. Pelajar dibahagikan kepada dua kumpulan, *micro-lecture* berasaskan kuiz (kumpulan eksperimen) dan *micro-lecture* berasaskan perbincangan dalam talian (kumpulan kawalan). Kedua-dua kumpulan menonton dan melaksanakan tugas secara talian dalam platform pembelajaran yang berbeza. Para pelajar menonton *micro-lecture*

dalam tempoh masa yang ditetapkan sebelum kelas dan kemudian menghadiri kelas dengan melibatkan diri dalam aktiviti pembelajaran yang aktif. Dalam proses pembelajaran *flipped classroom*, pelajar melaksanakan ujian pasca untuk topik yang dipelajari setiap minggu selepas sesi pembelajaran dan kemudian mengisi borang soal selidik mengenai penglibatan pelajar. Analisis data statistik deskriptif dan ujian-t telah menunjukkan terdapat perbezaan yang signifikan dalam pencapaian pelajar bagi kumpulan eksperimen dan kumpulan kawalan. Kesan ini menunjukkan bahawa kaedah *micro-lecture* berasaskan kuiz dapat meningkatkan pencapaian pelajar dalam pembelajaran mereka. Namun demikian, tidak ada perbezaan yang signifikan dalam penglibatan pelajar kecuali untuk penglibatan dari segi sumbangan yang membina dalam kelas, kumpulan eksperimen. Selain itu, tidak wujud hubungan yang signifikan untuk kumpulan eksperimen dalam beberapa penunjuk penglibatan pelajar (sumbangan yang membina-kognitif, tingkah laku-kognitif). Hasil kajian telah menunjukkan penglibatan pelajar bukan penunjuk yang baik untuk pencapaian akademik. Sumbangan penyelidikan ini memberikan kesefahaman yang mendalam kepada para pendidik lain untuk merekabentuk, membangun dan melaksanakan kaedah *micro-lecture* dalam persekitaran *flipped classroom* untuk meningkatkan penglibatan dan pencapaian pelajar dalam proses pembelajaran. Selain itu, garis panduan disediakan dari segi reka bentuk dan pembangunan untuk kaedah *micro-lecture* berasaskan kuiz dalam persekitaran *flipped classroom* melalui dua fasa yang dapat membantu pelajar belajar dengan mendalam daripada *micro-lecture* sebelum kelas. Para pelajar boleh menggunakan kebanyakan masa untuk berkolaborasi dengan guru dan rakan sebaya untuk meningkatkan prestasi akademik dan dapat memberikan sumbangan yang membina dalam pengajaran guru yang berbeza dengan *micro-lecture* berasaskan pembincangan.

**THE EFFECTS OF MICRO-LECTURE APPROACH ON STUDENTS’
ENGAGEMENT AND STUDENTS’ ACHIEVEMENT IN FLIPPED
CLASSROOM ENVIRONMENT**

ABSTRACT

Malaysia higher educational institutions continue to practice a traditional learning method, although there are many innovative and creative teaching pedagogy in recent education. Lack of interactivity between the lecturers and students in the traditional classroom affect the students’ engagement and students’ achievement in the learning environments. The problem of instructors to deliver the videos effectively in a flipped classroom also cause the students unable to focus and understand the important concepts about the topics. Therefore, this research investigated the effects of micro-lecture approach on students’ engagement and students’ achievement in flipped classroom environment. Social constructivism and cognitive load theory of student learning provided a comprehensive theoretical framework. A quasi-experimental design incorporated post-test only and students’ engagement instruments were used with a sample of 80 students who took Information and Communication Technology (ICT) course at a Malaysian University. Students were divided into two groups, quiz-based micro-lecture (experimental group) and discussion-based micro-lecture (control group). Both groups watched and finished the online tasks in different learning platforms. The students watched the video lecture in the selected time before class and then attended the class with active learning activities. In the flipped classroom learning process, students completed the post-test for the topics learned weekly after the lesson and then finally filled out a questionnaire on students’

engagement. The descriptive data was analysed and an independent samples t-test revealed there was a significant difference in students' achievement for experimental group. This effect suggested that the quiz-based micro-lecture could improve students' achievement in their learning. There was no significant difference in students' engagement except for students' agentic engagement, experimental group and control group. There was no significant relationship between the experimental group in some engagement indicators (agentic-cognitive, behavioural-cognitive). The result showed students' engagement was not a good predictor of the academic achievement. The contribution of this research provides a clear guideline that helps other educators to design, develop and implement the micro-lecture approach in a flipped classroom environment to increase students' engagement and students' achievement in the learning processes. In addition, guidelines on the design and development of micro-lecture approach have been provided in a flipped classroom environment with two phases, which able to assist the students learn deeply from the micro-lecture before class. The students can use most of the class time to collaborate with the teachers and peers to increase academic performance and ability to provide a constructive contribution in the teacher's instruction, which is in contrast for the micro-lecture with discussion setting.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The student-centered approaches which try to embrace technology become the teaching medium due to the recent changes in higher education. Therefore, the effectiveness of the educational materials and instructional methods are essential in teaching and learning. In this situation, Ward, Peters, & Shelley (2010) assert that the educators need to consider educational materials, instructional methods based on their pedagogical decision-making that can affect the quality of the learning materials in virtual and face-to-face learning settings. Innovative strategies and methods can bring great impacts to students' learning. According to Ferreri & O'Connor (2013), teaching approaches which go beyond the traditional lecture instruction are the most effective way to promote learning and best engage students.

In Malaysia Education Blueprint 2013-2015, the national curriculum aims to produce active thinker, communicator, and team player among the Malaysia students. Grapragasem, Krishnan & Mansor (2014) studies that the primary trend of teaching and learning is essential in Malaysian Higher Education. Information and Communication Technology (ICT) becomes crucial to transmit knowledge and information in higher education as teachers can apply the learning activities through electronic media. E-learning, blended learning, and virtual classroom are slowly gaining momentum even though many public and private colleges and universities in Malaysia still implementing the conventional method. Therefore, college and university curricula must ensure graduates equipped with relevant skills and knowledge to fulfill modern and future industry needs and developments. Arum, Cho,

Kim & Roska (2012) discuss that students nowadays are lack of the core competency skill of higher education, such as critical thinking skill, written communication skill, and complex reasoning skills. The employers have proved this situation in Malaysia Higher Education 2015-2025 that graduates have insufficient 21st century skills such as the skills in critical thinking, communication, and English language proficiency.

The primary objective of education is the students' learning. There are many educators have the desire to provide the personalized instruction for their students, which generally includes identifying the learners' needs and capabilities, making relevant and meaningful instruction, and providing the flexibility in the assignment, scheduling and pacing to maximize learning. Therefore, many researchers suggest a blended learning environment which suitable to provide personal instructions to the students (Cornelius & Gordon 2008; Dziuban, Hartman & Moskal, 2004; Garrison & Kanuka 2004; Patterson 2012; Verkroost, Meijerink, Lintsen & Veen, 2008).

Blended learning becomes one of the learning pedagogies to be implemented in education. Several researchers are defining blended learning approach as a method which connected the face-to-face classroom learning environment with computer-mediated activities that can be utilized to combine technology with the pedagogical principles (El-Mowafy, Kuhn & Snow, 2013; Graham, 2006; Watson, 2008). Florian & Zimmerman (2015) view that a blended learning environment can facilitate the skill acquisition required by learners to enter the worldwide workforce: the 21st century skill such as communication skills; collaborative skills; critical thinking skills; and potential to link one learning opportunity to another.

The flipped classroom is a blended learning approach which has gained attention in these recent years in education. There are many studies of the flipped classroom to define and explain the flipped classroom. The flipped classroom refers

as the inverted classroom, which is a blended learning approach that reverses the learning environment as the students watch the multimedia video lectures before class, followed by interactive exercises and activities in class (Johnson & Renner, 2012; Lage, Platt, & Treglia, 2000). Christensen, Horn, & Staker (2013) define flipped classroom as a subset under the blended learning category and refers to a specific learning approach where students often using some form of online delivery method to learn new material before attending class and the students are engaging in activities during the face-to-face classroom environment. Nwosisi, Ferreira, Rosenberg & Walsh (2016) describes flipped classroom as a form of blended learning that requires students to watch video lectures to learn new content online outside of the class time and participate the learning activities in class with teachers' personalized guidance and students' interactions.

The flipped classroom contains the online learning platform and a face-to-face learning environment. Therefore, online video becomes one of the essential components of this method to be used as learning materials to be uploaded online. According to Shieh (2009), a 60 second to 3 minutes' micro-lecture contribute more than introducing critical terms and concepts in a learning topic. Micro-lectures is suitable to implement in a flipped classroom environment. Educause (2012) describes a micro-lecture as a short audio recording or video presentation that focus on a single, defined topic. Sweet (2014) states that the use of micro-lectures become a growing trend in a flipped classroom.

Moreover, the micro-lecture is a relevant method which can implement through different components such as face-to-face teaching, blended learning or online learning. Similar to this research, Liu & Xu (2014) define a micro-lecture as a method to use video as the primary barrier to record important teaching and learning contents

in both inside and outside the classroom. This statement is supported by Hu (2015) that micro-lecture is the product of modern technology since it is a pedagogy that can capture students' attention and facilitate students' learning.

1.2 Background of the Study

A successful education system can encourage 21st century generations to face 21st century challenges. Malaysia Education Blueprint 2013-2025 is associated with the objectives of Ministry of Education Malaysia to produce great future generations which are knowledgeable and skillful in ICT, Science and Technology, effective communicators in several languages and able to have a confident personality by giving a contribution to the welfare in the different contexts. Many educators in educational institutions desire to apply interactive, student-centered teaching and learning approaches than the traditional lectures such as group activities, discussion, and class presentations on teaching and learning processes (Pearson Education, 2013; Sams & Bergmann, 2013; Wong & Chu, 2014). Mohammed, Kasim, & Mohd (2017) state that Malaysia universities are in the effort to implement ICT in their teaching and learning activities. The rapid development of ICT causes the traditional learning method to become inappropriate for the development operations of the educational process. Therefore, Malaysia universities need to reform the educational process to fulfill the need of the ICT evolution. Modern learning pedagogy focuses on direct students' interaction and positive learning techniques with teachers' guidance. According to Strayer (2007), it is essential to develop teaching approaches and the implementation of modern teaching strategies in the development of the educational process.

Several researchers review the implementation of the flipped classroom in the Malaysian context. The flipped classroom is not a new concept in Malaysia education. Jamaludin and Osman (2014) apply the flipped classroom method for TESOL students through an instructional design course. Rahman, Aris, Mohamed & Zaid (2014) assert that flipped classroom is suitable to be integrated into a variety of disciplines like Social Science, Mathematics, Science, Engineering, and Technology. Danker (2015)

studies the implementation of the flipped classroom in a film module to encourage deep learning when the students collaborate, interact actively in the learning process. Besides that, Jamaludin, Osman, Yusof, & Jasni (2016) investigate the effect students' interaction and engagement towards students' achievement in a flipped classroom environment, and the students have positive feedbacks on the implementation of the flipped classroom. Furthermore, Norazmi, Dwee, Suzilla, & Nurzarina (2017) recommend the implementation of flipped classroom approach in all areas of language learning and provide guidelines for the teachers and students to maximize the flipped classroom experience. In addition, the findings of Tazijan, Baharom, & Shaari (2017) indicate a positive relationship between flipped teaching and active learning which help to improve learners' verbal communication skills in certain ways.

In higher education, new teaching pedagogy such as learning through video is adapted to move away from the traditional classrooms. According to Giannakos (2013), micro-lecture gains popularity in both inside and outside classroom environments. This study is supported by Vieira, Lopes, and Soares (2014) to explain that micro-lecture can be a self-study medium or a learning tool to enhance the learning process in many higher education institutions and educational technology. Selvabarathi & Govindarajan (2016) assert that the flipped classroom is one of the latest methods that use video as a tool for learning. Hence, micro-lecture is suitable as the learning tool in the flipped classroom.

The micro-lecture is interrelated with a flipped classroom in online learning. According to Shieh (2009), David Penrose is the first person who proposed micro-lectures and explained that there are the same effects between the knowledge burst of micro-lectures and long regular lectures. Wu & Chen (2015) assert that the micro-lecture can be referred as microminiature video courses or micro class. Educause

(2012) views that micro-lecture provides support to the flipped classroom model as students watch the online lectures outside the class time while teacher review the learning resources, facilitate and assist the students in class time.

A good micro-lecture is just like the personal tutor for the students by providing one-to-one tutoring. In recent years, the production of videos becomes much easier with the existence of Web 2.0. Darwish & Lakhtaria (2011) define Web 2.0 as a platform for web-based applications and files and focus on the participation of the participatory Web, the social Web, and the read-write Web. Bower (2015) asserts that web 2.0 tools in the 21st century puts access to information at one's fingertips. The use of technology has become the new paradigm in education by providing the teachers with a variety of Web 2.0 tools. Teachers can deliver virtual lectures to their students through the use of technology. Zhang & Xu (2015) point out that the educators can use the web 2.0 tools such as screen-recording software to record short videos and then upload to the video sharing sites such as YouTube or other platforms for the learners. Educause (2012) explains that video contents in micro-lectures generally consist of a lecture, a narrated slide presentation, a screencast or other types of visual information that accompanied by a voice-over. The micro-lectures may have uploaded to the Learning Management System (LMS) or a public video sharing site like YouTube, TeacherTube, Vimeo, or iTunes U. Thus, it is one useful approach to implement a flipped classroom.

The flipped classroom is an active learning approach that encourages student engagement. Students will engage actively in the active learning environment. Trowler (2010) studies that student engagement is the interaction between the time, effort and other suitable resources which aimed to optimize the students' experiences and enhance their learning outcomes. Reeve (2013) indicates that there is a four-aspect

conceptualization of student engagement (behavioral engagement, agentic engagement, cognitive engagement, and emotional engagement). Reeve (2013) defines behavioral engagement as student involvement in the learning activity regarding effort, persistence, and attention. According to Reeve & Tseng (2011), agentic engagement refers to student self-learning with the instructional support by the instructors. Smart & Marshall (2012) define cognitive engagement as the students' elaboration, explanation, and justification as an idea towards the teachers' questions. Taylor & Statler (2014) view that emotional engagement is the selection of the materials purposely which encourage students' interaction and response to the materials. Several studies show that there is a causal connection between student engagement and student learning outcomes in higher education (Hu & Kuh, 2002; Krause & Coates, 2008). Sikarwar (2015) reports that the flipped classroom approach enables to receive instructor's immediate feedback as well as engage the students in large group teaching.

The use of active learning in the flipped classroom can bring a more significant impact on student's achievement. Algarabel & Dasi (2001) define achievement as the accomplishment of a person about a knowledge domain. Achievement means an outcome or an output of classroom interaction identified from the students' comprehension of the learning material by giving assessments to the learners (Gieve & Miller, 2006). Educators play a crucial role to understand the level of students' achievement. Educators can evaluate students' abilities and potentialities in academic subjects. This statement is supported by Karthigeyan & Nirmala (2016) that achievement is the key criterion to assess students 'capacity and skill. Rahman et al. (2014) state that the flipped classroom approach brings a positive impact on students' achievement in the learning processes. Jones (2016) supports this research by

explaining that the flipped classroom can improve learning outcomes and increase the students' engagement.

1.3 Problem Statement

There are some issues in current educational settings that require the higher education institutions and educator to change the way of teaching and learning to the students nowadays.

The first problem in a current learning environment in universities from Malaysia is the lack of engagement between lecturers and students. Oblinger & Oblinger (2005) assert that traditional lecture's engagement level is low. Kelly et al. (2005) also report that the student engagement in the lecture method is low compared to other teaching methods. Thomas, Subramaniam, Abraham, Too, & Beh (2011) prove that the traditional lecture makes the students focus on rote learning and cannot learn independently. The lectures who apply traditional classroom method give lectures, and interactive learning activities are limited in the classroom. The traditional role of an instructor is to provide a broad range of information to the students without encouraging the active learning activities and engage the students (Smit, 2009). Deslauriers, Schelew & Wieman (2011) support this finding with their study that traditional lecture method produces a lower student engagement in class compare to another interactive method. Warter-Perez & Dong (2012) argue that lecturer-student interaction in a traditional classroom is limited as this method is hard to embed active learning components into the class. Janor et al. (2013) support this statement as a traditional lecture makes the lesson dull and boring for the students as they are merely passive listeners and passive knowledge recipients in the learning process. Students' engagement is one of the factors which is vital to education. The traditional lecture does not produce a functional interaction between teacher-students, students-students. Bhalli, Sattar & Asif (2016) explains that many students think the traditional lecture is dull, less attractive, and teacher-centered since this learning style is a lack of

engagement and feedback between the teacher and students in the classroom. This situation occurs as the students come to the lecture hall without any preparation and do not have a chance to have possible opportunities to interact with others (Wang, Luo, & Qu, 2017; Williams, 2016).

Interaction is essential to engage the students. There is a relationship between interactivity and engagement. Myers, Martin, & Mottet (2002) state that interaction brings a significant effect on the achievement of learning outcomes and academic performance. Besides that, Sims (2003) examines that engagement is a prominent characteristic of interactivity. Hence, the lack of interactivity decreases student engagement in class. Besides that, an interaction can give a significant impact on students' achievement. Nugent (2009) asserts that producing and promoting positive cultures with healthy interactions can boost students' motivation to channel their energies and enthusiasm to accomplish their goals. Abdullah, Bakar & Mahbob (2012) support this statement as conducive classroom environment which involves two-way interaction between teachers and students can lead to effective learning outcomes.

The limited interactivity in traditional affects students' attention in class. This statement is supported by Scheele, Wessels, Effelsberg, Hofer, & Fries (2005) by stating that traditional lecture lack of interactivity and the students are very hard to pay attention and learn in this method. Goodwin & Miller (2013) support this finding by asserting that the students describe that the delivery of lectures may cover the information that they already understand, some may think the learning processes too slow or too fast depend on the students' abilities, and they also lack prior knowledge about the topic contents. Prensky (2001) states that students nowadays have short attention spans and interaction become a key component in instruction as they want immediate response to their actions. Therefore, the traditional lecture method is quite

limited to produce this type of learning environments. Young, Robertson, & Alberts (2009) show that student unable to retain information and gain deeper learning in the passive nature of traditional lectures. Several studies have been criticized the use of traditional lectures since this approach in the use of class time is ineffective, students find it hard to pay attention, they feel disengaged, the learning environments does not fit all levels of students, and the presented learning materials in typical lectures are limited (Aziz, Zain, Samsudin, & Saleh, 2015; Bhalli et al., 2016; Critz & Knight, 2013; Gilboy, Heinerichs & Pazzaglia 2015; McLaughlin et al.,2014; Zainuddin, & Attaran, 2015; Zakaria & Iksan, 2007). Similar to the Malaysia context. Husain, Ganapathy & Mohamad (2015) argue that the students feel bored easily with the long lectures and feel hard to maintain focus towards the long lectures packed with much information. Lack of interactivity between the lecturers and students also give negative impacts on students' learning outcomes. Passive learning in the traditional classroom is unable to produce active students.

In Malaysia education context, several researchers comment on the situation of the traditional classroom in teaching and learning. Neo & Neo (2004) state that the teacher in a traditional classroom deliver the lecture fully while the students follow the instruction passively. Husain et al. (2015) argue that the students feel bored quickly with the long lectures and feel hard to maintain focus towards the long lectures packed with much information. Lack of interactivity between the lecturers and students also give negative impacts on students' learning outcomes. Passive learning in the traditional classroom is unable to produce active students. Sinouvassane & Nalini (2016) assert that the traditional classroom method is not appropriate for students in the current education system.

Furthermore, the traditional method did not engage the student in the discussion or active learning activities as the teacher dominates the whole teaching and learning process (Li, 2016). Ajayi, Iahad, Ahmad & Yusof (2017) support this statement as the traditional classroom is the learning environment where the students receive information passively from the instructor. Similar to this research, Eachempati & Ismail (2018) indicate that traditional lecture is not suitable to the current generation as the students nowadays enjoyed collaborative learning in the small groups and learned from each other.

The second problem is the implementation of lecture materials via video by using the flipped classroom approach in education. Tucker (2012) mentions that there is not much research on the method to create videos with excellent quality. Herreid & Schiller (2013) explain that many teachers agree that videos as the choice of method to deliver the out-of-class part of the instruction, but it is tough to find excellent quality videos which suitable to be used in teaching and learning. Halili, Abdul Razak, & Zainuddin (2015) prove that poor video quality will make the students feel bored to watch it. Bergmann & Sams (2012) study that adopt the flipped classroom approach without considering the students' learning styles and needs will ruin the learning processes. Long and uninteresting online video affect the learning processes in the flipped classroom. Olsen (2015) states that a flipped classroom is not just about the usage of online videos to replace teachers or leave the students to learn on their own or students being left to learn on their own but designed to increase individualized learning time between teachers and students, engage the students in their learning. Karanicolas et al. (2016) assert that merely pre-recording lectures and uploading them online, asking students to watch the video does not guarantee student pre-class engagement.

The students in flipped classroom comment the video length is too long and tedious for them. According to Mason, Shuman & Cook (2013), video length is essential to keep students' attention in learning. For example, Amresh, Carberry and Femiani's (2013) report that watching long static online videos in the flipped classroom are boring. Enfield (2013) summarizes the findings from students' feedback by stating that the video length should be concise and suitable for the given content. Syam (2014) believes that video quality is a crucial factor to produce an excellent learning environment. Olson (2014) supports this statement by stating that the length of the videos contributed to a lack of interest in the learning material. Ossman and Warren (2014) state that student instead read the slides than watching the videos. Angelova, Kiryakova & Yordanova (2014) and Mohanty & Parida (2016) argue that the video lecture and learning resources cannot be long so that the students will not feel bored to learn. Similarly, the studies of Murray, Koziniec & McGill (2015) emphasize the video length in the flipped classroom need to be short as long videos make students feel bored and not motivated to learn. Zhang & Feng (2017) agree with this statement as long videos will make the learning ineffective. In Malaysia education context, the research about the use of video lectures in a flipped classroom is minimal. However, Ibrahim, Khairudin & Salleh (2018) reported a similar result with other studies as long videos to make the students feel boring to watch.

1.4 Rationale of The Study

The popularity of Information and Communication Technology (ICT) encourages the transformation of the higher education system to apply the student-centered method in teaching and learning processes. Teaching and learning can implement in many learning platforms such as online and face-to-face learning environment. Many previous studies have discussed the implementation of the flipped classroom in current educational settings. The flipped classroom is interrelated with the concept of social constructivism as the students view the learning materials outside the class time and interact with the teachers and peers in class. The video is the main barrier in a flipped classroom environment. Therefore, micro-lecture has been designed and developed in this study and implemented in a flipped classroom environment. Cognitive load theory has been used to design and develop the micro-lecture in order to make sure the learning materials can reduce cognitive overload among the students. Many researchers argue that the use of video only to replace lecture as pre-class activities cannot guarantee that the teaching and learning process become effective. Besides that, the online assessment is vital to assess students' understanding. Hence, the design and development of quiz-based micro-lecture (experimental group) and discussion-based (control group) applied in this study.

ADDIE Model is used as the guideline to design and develop the micro-lecture and learning activities as it provides a step-by-step process especially for the design and development of the learning materials which suitable for this study. ICT course has been chosen in this study as the instructors in the selected course-Introduction to ICT has been implemented the flipped classroom method in their learning practices and willing to participate in this study. The students in that course are divided into two

groups-experimental and control group as they view different types of micro-lecture (quiz-based/discussion-based) in different learning platform (Edpuzzle and Padlet).

1.5 Research Objectives

1. To design & develop the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment to investigate the students' engagement and students' achievement.
2. To investigate the effectiveness of the learning activities between the quiz-based micro-lecture approach and discussion-based micro-lecture approach based on the students' engagement in a flipped classroom environment in terms of: -
 - i. behavioral engagement
 - ii. agentic engagement
 - iii. cognitive engagement
 - iv. emotional engagement
3. To investigate the relationship between behavioral engagement, agentic engagement, cognitive engagement and emotional engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.
4. To investigate the effectiveness of the learning activities between the quiz-based micro-lecture approach and discussion-based micro-lecture approach based on the students' achievement in flipped classroom environment.
5. To investigate the influence of students' engagement towards students' achievement between the quiz-based micro-lecture approach and

discussion-based micro-lecture approach in flipped classroom environment.

1.6 Research Questions:

1. Is there any significant difference in student behavioral engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment?
2. Is there any significant difference in students' agentic engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment?
3. Is there any significant difference in students' cognitive engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment?
4. Is there any significant difference in students' emotional engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment?
5. Is there any relationship between behavioral engagement, agentic engagement, cognitive engagement and emotional engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment?
6. Is there any significant difference in student achievement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment?
7. Is there any significant influence of students' engagement towards students' achievement between the quiz-based micro-lecture approach and

discussion-based micro-lecture approach in flipped classroom environment?

1.7 Research Hypothesis

Research Question (1)

H₀: There is no significant difference in student behavioral engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

H_a: There is a significant difference in student behavioral engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

Research Question (2)

H₀: There is no significant difference in student agentic engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

H_a: There is a significant difference in student agentic engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

Research Question (3)

H₀: There is no significant difference in student cognitive engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

H_a: There is a significant difference in student cognitive engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

Research Question (4)

H₀: There is no significant difference in student emotional engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

H_a: There is a significant difference in student emotional engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

Research Question (5)

H₀: There is no relationship between behavioral engagement, agentic engagement, cognitive engagement and emotional engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

H_a: There is a relationship between behavioral engagement, agentic engagement, cognitive engagement and emotional engagement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

Research Question (6)

H₀: There is no significant difference in student achievement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

H_a: There is a significant difference in student achievement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

Research Question (7)

H₀: There is no significant influence of students' engagement towards students' achievement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

H_a: There is a significant influence of students' engagement towards students' achievement between the quiz-based micro-lecture approach and discussion-based micro-lecture approach in flipped classroom environment.

1.8 Conceptual Framework

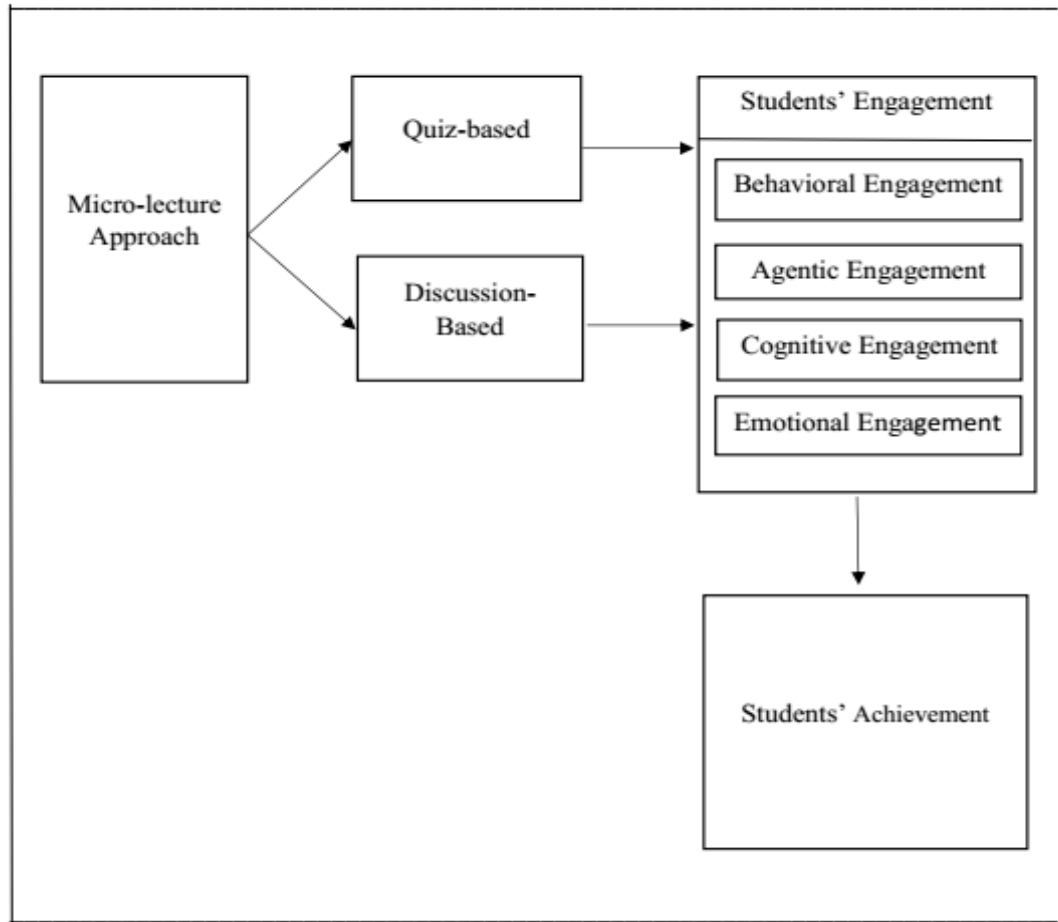


Figure 1.1. Conceptual Framework

In Figure 1.1 above, the conceptual framework is designed to investigate the effects of based micro-lecture approach on students' engagement and students' achievement in flipped classroom environment. This conceptual framework explains that the learning method taking place in this study is the micro-lecture approach which implements at the university undergraduate level. This figure illustrated the learning activity as the micro-lecture approaches divided into quiz-based micro-lecture approach and discussion-based. Quiz-based micro-lecture refers as pre-class videos which contain multiple-choice items and short answers that are posted in Edpuzzle